

In re: Brindel
Serial No.: 10/699,397
Filed: October 31, 2003
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In the Claims:

The listing of Claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Original) A liquid crystal display comprising:
a micro-electromechanical reflective array; and
a plurality of plates associated with the micro-electromechanical reflective array, the plates being movable between first and second positions, the plates being configured to operate in a first mode of operation when the plurality of plates are in the first position and configured to operate in a second mode of operation when the plurality of plates are in the second position.
2. (Original) The liquid crystal display of Claim 1, wherein the liquid crystal display further comprises a plurality of pixels, wherein ones of the plurality of plates correspond to ones of the plurality of pixels, wherein the first mode of operation is a reflective mode of operation and wherein the second mode of operation is a transmissive mode of operation.
3. (Original) The liquid crystal display of Claim 2, wherein the reflective mode comprises a pure reflective mode and the transmissive mode comprises a pure transmissive mode.
4. (Original) The liquid crystal display of Claim 2 further comprising an artificial light source, wherein the micro-electromechanical reflective array is positioned adjacent the artificial light source, and wherein the light source is exposed through the plurality of plates during the transmissive mode of operation.
5. (Original) The liquid crystal display of Claim 4, wherein the artificial light source comprises at least one of a light emitting diode (LED) in combination with a diffuser and an electroluminescent (EL) panel.

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6. (Original) The liquid crystal display of Claim 5 wherein the diffuser comprises a Lambertian diffuser.

7. (Original) The liquid crystal display of Claim 4 further comprising:
a plurality of micro-electromechanical hinges associated with the plurality of plates
and
attached to the micro-electromechanical array, the plurality of micro-electromechanical hinges being configured to move the plurality of plates between the first and the second positions.

8. (Original) The liquid crystal display of Claim 7 further comprising:
a sensor operably associated with the liquid crystal display and configured to sense ambient light and generate a control signal responsive thereto, wherein the plurality of micro-electromechanical hinges are further configured to move the plurality of plates between the first and second positions responsive to the control signal.

9. (Original) The liquid crystal display of Claim 8 wherein the sensor comprises at least one of a phototransistor and a photodiode.

10. (Original) The liquid crystal display of Claim 8 wherein the micro-electromechanical array and the plurality of plates comprise conductive elements, wherein the control signal is applied to the plates in the first position, and wherein the control signal is not applied to the plates in the second position.

11. (Original) The liquid crystal display of Claim 10, wherein the conductive plates are attracted to the conductive array when the control signal is applied and conductive plates are not attracted to the conductive array when the control signal is not applied.

12. (Original) The liquid crystal display of Claim 11 wherein the control signal is a voltage control signal.

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13. (Original) The liquid crystal display of Claim 1 further comprising:
an artificial light source, the micro-electromechanical reflective array overlying the artificial light source;

a rear polarizer layer overlying the micro-electromechanical reflective array;
a first transparent layer overlying the rear polarizer layer;
a liquid crystal display layer overlying the first transparent layer;
a second transparent layer overlying the liquid crystal display layer; and
a front polarizer layer overlying the second transparent layer.

14. (Original) The liquid crystal display of Claim 13 wherein in the first position, the plates are substantially parallel to the liquid crystal layer, and in the second position, the plates are substantially normal to the liquid crystal layer.

15. (Original) A liquid crystal display comprising:
a micro-electromechanical reflective array disposed in a liquid crystal display;
a plurality of plates associated with the micro-electromechanical reflective array, the plates being movable between first and second positions, the first position being substantially parallel to the liquid crystal display and the second position being substantially normal to the liquid crystal display; and

a sensor configured to sense ambient light and generate a control signal, the plurality of plates being configured to be in the first position when the control signal is asserted and configured to be in the second position when the control signal is not asserted.

16. (Original) The liquid crystal display of Claim 15 further comprising:
an artificial light source, wherein the micro-electromechanical reflective array overlies the artificial light source, wherein the artificial light source is blocked and ambient light is reflected when the plates are in the first position and wherein the artificial light source is exposed when the plates are in the second position.

17. (Original) The liquid crystal display of Claim 16, wherein the artificial light

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source comprises at least one of a light emitting diode (LED) in combination with a diffuser and an electroluminescent panel.

18. (Original) The liquid crystal display of Claim 17 wherein the diffuser comprises a Lambertian diffuser.

19. (Original) The liquid crystal display of Claim 15 further comprising:
a plurality of micro-electromechanical hinges associated with the plurality of plates and attached to the micro-electromechanical array, the plurality of micro-electromechanical hinges being configured to move the plurality of plates between the first and second positions.

20. (Original) The liquid crystal display of Claim 19 wherein the plurality of micro-electromechanical hinges are further configured to move the plurality of plates between the first and second positions responsive to the control signal.

21. (Original) The liquid crystal display of Claim 15 wherein the sensor comprises at least one of a phototransistor and a photodiode.

22. (Original) The liquid crystal display of Claim 15 wherein the micro-electromechanical array and the plurality of plates comprise conductive elements, wherein the control signal is applied to the plates in the first position, and wherein the control signal is not applied to the plates in the second position.

23. (Original) The liquid crystal display of Claim 22, wherein the conductive plates are attracted to the conductive array when the control signal is applied and conductive plates are not attracted to the conductive array when the control signal is not applied.

24. (Original) The liquid crystal display of Claim 23 wherein the control signal is a voltage control signal.

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25. (Original) The liquid crystal display of Claim 15 further comprising:
an artificial light source, the micro-electromechanical reflective array overlying the artificial light source;

a rear polarizer layer overlying the micro-electromechanical reflective array;

a first transparent layer overlying the rear polarizer layer;

a liquid crystal layer overlying the first transparent layer;

a second transparent layer overlying the liquid crystal layer; and

a front polarizer layer overlying the second transparent layer.

26. (Original) A device comprising:

a housing;

a liquid crystal display integrated with the housing, the liquid crystal display including a micro-electromechanical reflective array and a plurality of plates associated with the micro-electromechanical reflective array, the plates being movable between first and second positions, the plates being configured to operate in a first mode of operation when the plurality of plates are in the first position and configured to operate in a second mode of operation when the plurality of plates are in the second position.

27. (Original) The device of Claim 26, wherein the device comprises a mobile terminal, wherein the liquid crystal display further comprises a plurality of pixels, wherein ones of the plurality of plates correspond to ones of the plurality of pixels, wherein the first mode of operation is a reflective mode of operation and wherein the second mode of operation is a transmissive mode of operation.

28. (Original) The device of Claim 27 wherein the reflective mode comprises a pure reflective mode and the transmissive mode comprises a pure transmissive mode.

29. (Original) The device of Claim 27 wherein the liquid crystal display further comprises an artificial light source, wherein the micro-electromechanical reflective array is positioned adjacent the artificial light source, and wherein the light source is exposed through the plurality of plates during the transmissive mode of operation.

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30. (Original) The device of Claim 29 wherein the liquid crystal display further comprises a plurality of micro-electromechanical hinges associated with the plurality of plates and attached to the micro-electromechanical array, the plurality of micro-electromechanical hinges being configured to move the plurality of plates between the first and second positions.

31. (Original) The device of Claim 30 further comprising:
a sensor positioned adjacent the liquid crystal display and operably associated with the liquid crystal display and configured to sense ambient light and generate a control signal responsive thereto, wherein the plurality of micro-electromechanical hinges are further configured to move the plurality of plates between the first and second positions responsive to the control signal.

32. (Original) The device of Claim 31 wherein the micro-electromechanical array and the plurality of plates comprise conductive elements, wherein the control signal is applied to the plates in the first position, and wherein the control signal is not applied to the plates in the second position.

33. (Original) The device of Claim 32, wherein the conductive plates are attracted to the conductive array when the control signal is applied and conductive plates are not attracted to the conductive array when the control signal is not applied.

34. (Original) The device of Claim 26 wherein in the first position, the plates are substantially parallel to the liquid crystal display, and in the second position, the plates are substantially normal to the display.

35. (Original) A device comprising a dual mode liquid crystal display that operates in a purely transmissive mode or a purely reflective mode.